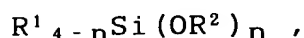


WHAT IS CLAIMED IS:

1. A coating solution for the formation of a silica-based coating film on the surface of a substrate which comprises, as a uniform solution:

(A) an organic solvent; and

(B) an organopolysiloxane, which is a hydrolysis-condensation product of a polyalkoxy silane compound represented by the general formula



in which  $R^1$  is a hydrogen atom or a monovalent hydrocarbon group,  $R^2$  is an alkyl group and the subscript  $n$  is 2, 3 or 4, dissolved in the organic solvent in the presence of a basic compound.

2. The coating solution as claimed in claim 1 in which the polyalkoxy silane compound is selected from the group consisting of tetraalkoxy silane compounds, trialkoxy silane compounds and monoalkyl trialkoxy silane compounds.

3. The coating solution as claimed in claim 1 in which the organic solvent as the component (A) is an aprotic polar solvent selected from the group consisting of N-methyl pyrrolidone, dimethyl formamide and dimethyl acetamide.

4. The coating solution as claimed in claim 1 in which the concentration of the organopolysiloxane as the component (B) is in the range from 5 to 25% by weight calculated as  $SiO_2$ .

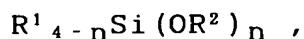
5. The coating solution as claimed in claim 1 in which the monovalent hydrocarbon group denoted by  $R^1$  is selected from the group consisting of methyl, ethyl, propyl and butyl groups.

6. The coating solution as claimed in claim 1 in which the alkyl group denoted by  $R^2$  is selected from the group consisting of methyl, ethyl, propyl and butyl groups.

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7. A method for the preparation of a coating solution which comprises the steps of:

(a) dissolving a polyalkoxy silane compound represented by the general formula



in which  $R^1$  is a hydrogen atom or a monovalent hydrocarbon group,  $R^2$  is an alkyl group and the subscript  $n$  is 2, 3 or 4, in a first organic solvent, which is an alcohol solvent, to give a solution, in a concentration in the range from 1 to 5% by weight calculated as  $SiO_2$ ;

(b) admixing the solution with a basic compound and water to effect hydrolysis of the polyalkoxy silane compound so as to give an organopolysiloxane as a hydrolysis-condensation product thereof; and

(c) replacing the first organic solvent in the solution with a second organic solvent, which is an aprotic polar organic solvent, in such an amount that the concentration of the organopolysiloxane in the solution is in the range from 5 to 25% by weight calculated as  $SiO_2$ .

8. The method for the preparation of a coating solution as claimed in claim 7 in which the basic compound is ammonia or an amine compound.

9. The method for the preparation of a coating solution as claimed in claim 8 in which the basic compound is ammonia.

10. The method for the preparation of a coating solution as claimed in claim 7 in which the amount of the basic compound is in the range from  $10^{-1}$  to  $10^{-5}$  mole per mole of the polyalkoxy silane compound.

11. The method for the preparation of a coating solution as claimed in claim 7 in which the amount of water is in the range from 2.0 to 20 moles per mole of the polyalkoxy silane compound.

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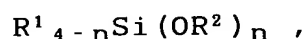
12. The method for the preparation of a coating solution as claimed in claim 7 in which the aprotic polar organic solvent is selected from the group consisting of N-methyl pyrrolidone, dimethylformamide and dimethylacetamide.

13. A method for the formation of a silica-based coating film on the surface of a substrate which comprises the steps of:

(1) coating the surface of a substrate with a coating solution comprising, as a uniform solution,

(A) an organic solvent, and

(B) an organopolysiloxane, which is a hydrolysis-condensation product of a polyalkoxy silane compound represented by the general formula



in which  $R^1$  is a hydrogen atom or a monovalent hydrocarbon group,  $R^2$  is an alkyl group and the subscript  $n$  is 2, 3 or 4, dissolved in the organic solvent in the presence of a basic compound, to form a coating layer;

(2) drying the coating layer by heating to form a dried coating layer;

(3) subjecting the dried coating layer to a baking treatment at a temperature of 350 °C or higher.

14. The method for the formation of a silica-based coating film on the surface of a substrate as claimed in claim 13 in which the temperature of the baking treatment in step (3) is in the range from 350 to 800 °C.

15. The method for the formation of a silica-based coating film on the surface of a substrate as claimed in claim 13 in which the temperature of heating for drying in step (2) is in the range from 80 to 300 °C.

16. A silica-based coating film formed on the surface of a substrate which has a dielectric constant not exceeding 2.5.

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